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ABSTRACT

This paper explicates private corporation's role in developing and executing educational partnerships to serve elementary and secondary schools. The impact of these partnerships on distance learning is discussed, as well as the cooperative role of private enterprise in serving the public authority by addressing the educational needs at the local, regional, state, and national levels. Two models for public/private partnerships are proposed: the public/private cooperative and the private corporation as a stand-alone provider. The critical needs, as well as the barriers for implementing the models, are outlined. As a backdrop to this discussion, a historical perspective is established by reviewing the role of private entrepreneurship in technological innovation of distance learning technology (telephone, broadcast and cable television, microcomputer, and satellite) and the influence of legislative and regulatory mandates in the educational application of these technologies. The paper concludes by hypothesizing the impact and challenges to the educational partnership on distance learning activities in the future. (25 references) (Author/DB)

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THE ROLE OF PRIVATE BUSINESS IN DISTANCE LEARNING:

THE EDUCATIONAL PARTNERSHIP

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ABSTRACT

The following paper explicates private corporation's role in developing and executing educational partnerships to serve elementary and secondary schools. The impact of these partnerships on distance learning is discussed, as well as the cooperative role of private enterprise in serving the public authority by addressing the educational needs at the local, regional, state and national levels. Two primary models for public/private partnerships are proposed. The critical needs, as well as the barriers for implementing the models, are outlined. As a backdrop to this discussion, a historical perspective is established by reviewing the role of private entrepreneurship in technological innovation of distance learning technology and the influence of legislative and regulatory mandates in the educational application of these technologies. The paper concludes by hypothesizing the impact and challenges to the educational partnership on distance learning activities in the future.

BACKGROUND

The entrepreneurship of private enterprise is directly responsible for the myriad of distance learning technologies that are currently being employed in schools across the United States. For the purpose of this paper, distance learning technologies are types using video, computer and/or audio to transmit interactive instruction from one central location to multiple geographically separate ones. Satellite and telephone-based transmissions are the most widely used modes. Interactivity requires the ability of the users to send, as well as receive, information at any given site.[1]

Initially, the motivating factors for developing a technological innovation were not for educational applications but for other profit making ventures; therefore, the application of these technologies were reinvented for educational purposes. Two critical events are responsible for the emergence of private business in distance learning: 1) development of technological innovations coupled with widescale diffusion/adoption and 2) legislative and regulatory reform.

TECHNOLOGICAL INNOVATION

There are five broad types of technological innovations that are employed in various combinations for distance learning. The communication technologies that are under discussion include the following in the order of introduction into society: the telephone, broadcast television, cable television, the computer and satellite videoconferencing. Three factors are attributed to widescale diffusion, adoption and implementation of these communication technologies: 1) a decrease in the cost of the hardware, 2) the miniaturization of the technology and 3) the perceived utility of the technology.[2] All of these technologies began as private entrepreneurial ventures.

The Telephone System

In 1886 Alexander Graham Bell and associates invented the telephone. The national telephone system as we know it today was not developed overnight, rather it evolved over the period from 1886 to 1940. Bell was very progressive in his forecast regarding the universal application of the telephone in society. He predicted that this technology would be widely adopted by all strata of society for the purpose of communication and information dissemination.[3] To ascertain that his vision become reality, this entrepreneur developed "user friendly" technology, that was uncomplicated, simple to use and low in cost. Because of the wiring necessary to receive a telephone transmission, the densely populated urban areas were most cost-effectively served in the early stage of telephone technology diffusion.

Over a hundred years post-invention, today the telephone is an essential communications tool at home and at work. New uses of the telephone have only surfaced in the last twenty years as other technologies (i.e., facsimile machines, computer modems, speakerphones for audio teleconferencing) were invented to piggy-back on the telephone system. The growth of inventions were partially spurred by the energy crises that increased communication and educational training by telephone (audio) conferencing.[4,5]

The recent deregulation and divestiture of AT&T in 1984 has allowed telephone companies to own and operate cable systems and to enter other markets,

such as microcomputers and cellular phones. The strategy employed by some of the progressive telephone vendors, such as Pacific Telesis, is to expand services by including audio, video and data technologies. The services may include distance learning applications, video conferencing and audio/video phone service into the home. The trend of acquiring cable systems and using fiber optic technologies both nationally and internationally has resulted in a blurring of the boundaries between telephone and broadband video services.

Broadcast Television

Another milestone in communications was the introduction of full-motion television via network stations, profit making entities that offered entertainment and news free to anyone who had a television set that could pull in the signal. The number of televisions in the home boomed from 10 percent in 1950 to a whopping 90 percent by 1960.[6] Today, 92 million homes in the United States receive broadcast television.[7]

Beginning as early as the late 1940's, these Networks profited by developing programs that were sponsored by commercial enterprises. Today, the entrepreneur Chris Whittle of Whittle Communications is using this model to promote his commercial sponsored news programming for delivery into schools. Ted Turner has matched the Whittle challenge by offering at no charge to any school with a satellite dish one hour daily of non-commercial news programming.

The application of noncommercial educational television began in 1967, when the Carnegie Commission on Educational Television released its report Public Television, A Program for Action: Report and Recommendations. The report recommended to Congress that, "through the diversified uses of television, Americans will know themselves, their communities, and their world in richer ways...Public television is capable of becoming the clearest expression of American diversity and excellence."[8] Congress embraced these recommendations and passed the Public Broadcasting Act of 1967, thereby allowing non-profit, nongovernmental corporations to promote and finance public television for educational programming.

Cable Television

While the Networks were making profits by programming their televised broadcasts, local entrepreneurs in rural areas of the country were constructing regional antennae to pull in the signals from these broadcasts in areas where reception was poor. The first example was in 1948, when a local radio repairman in a mountainous region of the country constructed an antenna to serve his

community. This antenna was located at the peak of a mountain where the televised broadcast was excellent. Coaxial cable was run from the antenna to the homes of local residents. The local businessman charged a fee to each "subscribing" home for running the cable and for receipt of the broadcast signals; hence the beginning of cable television service as we know it today. Cable television is currently found in fifty-five percent of homes equipped with televisions.[9]

The multi-channel capacity of coaxial cable and the advent of satellite-based program offerings over and beyond these offered by the Networks has resulted in a viable business with endless programming opportunities. Though the federal government outlined the minimum requirements for a cable system, the primary responsibility for selecting and evaluating a system has been passed on to the local community. In a climate of deregulation, competition among cable systems exists in the form of a franchise agreement process. Locally, a community franchise board outlines the criteria for a proposal. Each cable vendor that submits an application details the plan for program offerings and hardware installation. How well the vendor meets the needs of the community is evaluated by the franchise board. To live up to the expectations of a franchise board for community services, cable operators have included channels dedicated for community services and education.

Though cable television has held promise at serving the information and educational needs of a community or nation, this application remains in its infancy. Entrepreneurial ventures such as Warner Communication's QUBE system combined interactivity--subscribers responded to television programs with five response buttons on a calculator sized console--with instructional college-credit courses taught by colleges/universities in Columbus, Ohio. In 1978, when these courses began; however, little use was made of the interactive keypad. Most instructors opted for prerecorded videotapes. On an average, less than fourteen students enrolled in any course making it a less than profitable venture. In 1979 QUBE abandoned the offering of college-credit courses.[10]

Other experiments with formal educational offerings via interactive cable were conducted on a small scale; however, they like QUBE, were deemed less than successful. Examples include: Oregon State University, O'Brien Communication's Senior Citizen's Project (Reading Pennsylvania Project), and Rand Corporation's Spartenburg Project (South Carolina). [11],[12],[13] Adults rather than children have been typically the audience for these experiments.

Microcomputers

In 1976, computers for one's personal use at home or business were introduced to the marketplace by Apple Computer. Two entrepreneurs, Steve Jobs

and Steve Wozniak, the Founders of Apple, are credited with developing the single most important communications tool of this decade. Following on the heels of Apple were the larger computer companies like IBM, Radio Shack and Wang.

The diffusion of computers has happened very rapidly. In a decade approximately 1.7 million computers have been diffused in schools. With 95 percent of the elementary and secondary schools having adopted at least one computer, the computer is an example of a technological innovation that has been successfully diffused within educational institutions.[14]

Without a doubt the microcomputer is an essential tool that has changed the complexion of the workplace, educational institutions and home. Computer conferencing and stand-alone software provide both an opportunity for electronic messaging/mail as well as education.[15]

Satellite Videoconferencing

During the 1980's, satellite videoconferencing began to be used by businesses to conduct meetings and train employees. While the Atlantic Richfield Corporation (ARCO) was the innovator, today many organizations have constructed rooms engineered to be both aesthetically pleasing as well as acoustically excellent.[16] In this environment, participants may electronically see and hear others who are geographically remote.

Today, satellite videoconferencing facilities are present in many corporations. These are being utilized for employee education/training as well as business meetings. Corporate examples include IBM, Ford, Amway, Hewlett Packard, Aetna Insurance and AT&T which offer formal educational programs to employees. Several factors account for the emergence of satellite videoconferencing as an educational/communications tool, these include: 1) the high cost of moving people to a central location, 2) decreased cost of satellite transponder time and satellite receive hardware, 3) an increase in the number of transponders for lease and their availability at different frequencies (C- versus Ku-band), 4) ability of the satellite signal to cover the nation regardless of geographic barriers and 5) attributes of the medium (live, interactive video) which are most analogous to the traditional meeting and/or classroom.

A combination of these factors have influenced the feasibility of these technological innovations for elementary and secondary schools in the nation. All of the preceding innovations have been instrumental in the application of instructional offerings using technology. For the purpose of this paper, the authors focus on the application of satellite technology because: 1) their expertise is in satellite-delivered

instructional programming for students and teachers and 2) satellite technology has the potential of reaching any student and teacher located in the continental United States.

With private enterprise being the traditional provider of both technology and innovative services, it is of little surprise that private, as well as the public sector, are harnessing satellite videoconferencing for educational applications. Legislative and regulatory reforms have reinforced the applicability to education.

LEGISLATIVE AND REGULATORY REFORM

National and state legislative and regulatory reforms have greatly influenced the application of technology for education. First, to more clearly understand how broadband video technologies were applied to education, the following reviews the reforms of these video services at the national level. These set the stage for educational offerings via television using satellite or microwave technologies. Congressional initiatives and those enacted from the Federal Communications Commission (FCC) mandated the application of communication technologies for educational purposes. The Public Broadcasting Act of 1967 created Public Broadcasting Television and subsequently, the Corporation for Public Broadcasting, for the purpose of developing and broadcasting commercial-free educational programming. Sesame Street and The Electric Company demonstrated how reading skills could be acquired through high-attention grabbing PBS production techniques.[17]

Next the Cable Television Report and Order of 1972 enacted by the FCC outlined rules and regulations for cable systems. The mandate was for each system to reserve at least one channel for education and to make technical provisions to enable the system to be used for two-way (interactive) applications.

Secondly, at the state level, curriculum reform initiatives have characterized the 1980's. The purpose of these reforms has been to specifically mandate secondary level curriculum in critical subjects as math, science and foreign languages as a condition for graduation.

The catalyst for educational reform at the State level is traceable back to the 1983 report that grew out of the National Commission on Excellence in Education, A Nation at Risk. In the Report, four recommendations were made to prevent further erosion of the nation's educational system: 1) revamping curriculum by including more basics such as, math and science, 2) raising the overall graduation standards for elementary and high school students, 3) equalizing access and 4) increasing institutional accountability.[18]

Teachers have been impacted by the reform movement in several ways. Certification and continuing education requirements have been increased. Schools in many cases must meet higher standards for accreditation or be consolidated into larger school systems. In addition, many state legislative reforms increased the type and number of courses for entrance into state-funded universities.

Texas responded to these needs for reform by passing in 1985, House Bill 72, Chapter 25. The state initiated new mandates in virtually every area of public education including: teacher preparation, teacher certification, student testing, career ladder requirements, teacher pay raises, alternative certification provisions, basic skills remediation and increased academic standards.

To enable schools across Texas to implement these mandates, TI-IN Network, Inc. emerged as the first private interactive satellite network for elementary and secondary school students and their teachers. The venture was conceived in 1984 and was fully operational in 1985 in partnership with Education Service Center Region 20.

With an increase in curriculum mandates and a shortage of teachers in these critical subjects, the climate was right for distance learning. In program offerings, the curriculum mandates are directly correlated with the perceived utility and subsequent receptivity of school administrators to the application of DLS such as TI-IN Network. A Partnership between private and public entities is one method of developing distance learning systems by sharing both financial and instructional resources.

MODELS FOR PUBLIC/PRIVATE PARTNERSHIP IN SATELLITE DELIVERY SYSTEMS

Technological innovation and legislative reform have unwittingly forged the development of public/private partnerships in the delivery of distance learning. Schools like private enterprise are worried about bottom line costs. To upgrade curriculum and hire new teachers requires funds. The funds available at the federal, state and local levels are shrinking. Nowhere is the problem more acute than in areas where students are already underserved -- small, rural and/or isolated schools. In these regions of the country having funds to hire teachers may be secondary to recruiting highly qualified teachers.

Though Distance Learning Systems (DLS) offer promises and hope for expanding educational resources in these schools, the facts are that to operate a system requires enormous amounts of capital. Public agencies alone are rarely able to fund a DLS without receiving special funding or corporate sponsorship.

Therefore, partnerships between public agencies and private enterprise are being formed to help finance the delivery of needed curriculum; thus, assuring on-going accreditation of schools and affording students the opportunity to partake in advanced curriculum that allow them to be competitive in the larger marketplace. There are at least two primary types of organizational structures that are being formed to successfully implement distance learning systems: 1) The Public/Private Cooperative and 2) Private Corporations as a Stand-Alone Provider.

These models are viable because of the following two factors: 1) each successfully addresses the economics of distance learning and 2) each capitalize on the unique ability of an organization to contribute to the partnership -- the public to manage instructional programming and the private to market the service and technically tie it all together.

MODEL ONE: THE PUBLIC/PRIVATE COOPERATIVE

One most commonly recognized model is that of public and private organizations combining their expertise and resources. Under such an arrangement the educational institution, which may be a college, university, local education agency (school system) or intermediate unit, assumes the responsibilities that they understand best, curriculum development and teaching. The private corporation may provide a number of services which include: the necessary broadcast facilities (uplink), satellite receiving equipment (downlink), the administrative functions related to operating a satellite network and the marketing of student courses and services. The private company also bears the financial costs for operating the system and assumes all financial risks associated with network operations. Ideally, together each organization builds on their specific expertise to provide the best service possible to students and their teachers and to receive appropriate financial rewards based on the function they perform.

TI-IN Network, Inc. is a successful example of this model. TI-IN evolved in partnership with the Education Service Center, Region 20, in San Antonio. Under this partnership, each shares in the development and the costs of maintaining a network. Education Service Center, Region 20 hires the instructors, develops the curriculum, produces the direct student instruction and houses the broadcast studios and uplink facilities. Under a fixed contract with TI-IN Network, Region 20 pays for operating expenses associated with operating a "school of the air" including amortizing their equipment costs at the studio. TI-IN Network, Inc. is responsible for registering students, marketing the programming, installing downlink equipment, planning staff development and student enrichment programming, and operating and maintaining the satellite network. The student and subscription fees are the methods used by TI-IN to finance and operate the network and to receive a return on their

investment dollars. Since 1985, together TI-IN and Region 20 have served well over 7,000 students and an estimated 150,000 teachers across 32 states located at 790 school sites.

These types of partnerships have advantages beyond economics. From an implementation strategy, each partner becomes a stakeholder in the process of making the service as cost effective, trouble-free, and of the highest quality possible. To carve a successful niche in a competitive marketplace where the traditional model of face-to-face education is the preferred medium, programming must be responsive both to the needs of users and maintain the interest of students. When the service is supported by subscription fees paid by each school, users are less likely to tolerate technical problems and mediocre programming.

Other advantages include the ability of an entrepreneurial enterprise to quickly move ahead using both rational as well as intuitive management strategies. These organizations are able to respond to needs faster than the public agencies that have multiple bureaucratic rules and procedures. Government agencies are notorious for conducting protracted "needs analyses" as a rationale for moving forward on a project; even after the report is written and needs are substantiated, the change is frequently not implemented on a timely basis. In a rapidly changing environment, the ability to respond on a timely basis is essential.

For example, TI-IN Network responded quickly to a need for English as a Second Language (ESL). In 1988, the Texas State Legislature mandated that ESL be offered in each school. As incidents of students that require ESL varies greatly from small to large numbers, rural schools could not develop a course on a timely basis to implement ESL. TI-IN's response was to quickly develop and offer instruction via satellite to assist the subscribing districts to comply with the mandate.

The success of these private and public partnerships rests on the essential requirement for each partner believing that this is advantageous and a winning situation for all parties invested in the partnership. The following three examples of how these partnerships model may emerge are exemplified below.

Star Schools Program Promotes Partnership

The advent of Star Schools funding has promoted the emergence of the partnership model. Partnerships were formed, as a condition of the Request for Proposal, among state agencies, institutions of higher learning, regional service centers and private enterprise. All four recipients of the funding have multiple partners across multiple states. TI-IN Network's role in its Star Schools funded project is that of managing partner and fiscal agent of the nine member partnership

know as the TI-IN United Star Network. Like the partnership TI-IN has with Education Service Center, Region 20, the public education entities that serve as Star Schools partners develop and offer instructional programming while, TI-IN equips sites and operates and maintains the satellite network. The result is that five other partners, four institutions of higher learning and one state agency, now contribute programming to the Network as a whole. Because more than two organizations compose this partnership the newest iteration of the model requires a different management strategy. The overall policy and direction for the partnership is provided through a governance board where each partner holds one vote.

This partnership model is effective and probably the most successful because it is dependent on meeting the diverse needs of the users across the nation. However, the direction of the partnership may be designed to meet either highly localized, regional and statewide needs or those of national interest.

The National Resource Sharing Network

A National Resource Sharing Network is a partnership model with an emphasis on serving schools across the nation using a whole range of program providers. Satellite technology enables public/private partnerships to develop academic and teacher training with national application. The high cost of quality programming necessitates off-setting this investment with a large subscriber base. Numerous program offerings are possible, ranging from advanced math and science for the academically talented, to college credit courses and staff development programming for teachers and other school professionals. The advantages associated with using interactive satellite-based television includes accessibility to experts in various fields to groups nationwide thus, minimizing the barriers of time, distance and economic resources.

The model assumes that no one provider will dominate in the marketplace. Educational institutions who have been equipped with downlink technology will be able to select from a wide range of offerings and providers. Some have suggested that educational programming should be aggregated on a single satellite which may be accessed by various interested groups. If access is increased and transponder costs shared by users and providers the National Resource Sharing Network would be facilitated. Actual application of this model will need to be made possible through local, state and federal funding sources.

Regional and State Networks

A state or a specific region has communication as well as instructional needs that are specific to its constituency. These geographic areas may be served by operating independent networks or by feeding off the National Resource Sharing Network model. Many of these regional programs have national application and may be broadcast to a larger audience. This model is patterned after the successful North Carolina Distance Learning System which equipped 171 schools with TI-IN's satellite receiving technology. TI-IN provides its nationally delivered instructional offerings which are augmented by local programs developed and produced in North Carolina. The most frequent user of the network is the State Department of Education who conducts administrative meetings and seminars.

Building of statewide distance learning systems is the TI-IN United Star Network model. The Star Schools legislation enables Alabama, Mississippi, Illinois and California the opportunity to join in partnership in implementing statewide systems. Together the Network offers a rich array of programming, including more than 400 hours of staff development and 22 exemplary courses in math, science and foreign language. Each partner contributes programming locally and to the national resource. In turn, each partner may use downlinks installed at local schools to form a statewide communications and instructional network.

To the extent the situation exists of using both the state and national models, then cost sharing between the national and regional/state networks help defray operational costs. The National Resource Sharing Network, augmented by the Regional and State Networks, offers the best economic solution and the highest return on the financial investment. The Statewide model personalizes the communication needs of a partner while, the National Resource Sharing expands program choices. Together these models offer the "best of all worlds" and helps alleviate the shortage of instruction in the critical subjects at an affordable cost.

MODEL TWO: PRIVATE CORPORATION AS A STAND-ALONE PROVIDER

A second more controversial model is that of private enterprise as a sole provider of credit classes and staff development training. Private companies should be encouraged to become fully accredited schools which deliver credit classes via DLS. "Private schools-of-the-air" would continue to be responsible for both the needs of users and to comply with requirements of public education authorities.

However, under this scenario, students would have access to their classes on location at their school, at home or at any one of a number of locations. Full credit would be awarded for the course work and such credits would be applicable for graduation credit.

Under this model, private corporations work with state agencies and contract directly with educators to provide instruction. The model expands the role of the corporation from a sole provider of technical assistance to that of a "full service provider." As more public educational agencies are beginning to increase their technological expertise, it is not surprising that private enterprise would look toward increasing its programming expertise. The advantage of the private school model is that quality control would be easier to manage. Teaching and production standards would be more easily monitored and maintained. It would bring competition to the educational marketplace rewarding those who best meet the needs of the student.

Because of the extensive network of public education in the United States, public and private organizations are required to work together in any distance learning venture. The partnership model which is selected must meet the needs of the partners as well as accommodate the expectations and needs of the marketplace by managing effectively and successfully the cost considerations of DLS operations.

NEEDS OF THE MARKETPLACE

The educational community has been traditionally slow to embrace technological innovation or new instructional methods. However, meeting the perceived and actual needs of educators is the first step toward a successful implementation of DLS.

Meeting Basic Curriculum Requirements with a Teacher Shortage

The primary motivations for the elementary and secondary school's use of DLS includes meeting the mandates imposed by curriculum reform and responding to teacher shortages. Mandates imposed by curriculum reform are frequently impossible to meet through traditional means; rural districts are either unable to fund expanded curriculum requirements or unable to recruit and hire teachers in the critical subject areas of math, science and foreign languages.

The National Education Association predicts the United States will require a million new teachers by the 1990's. In addition to the shortage is the problem of retention, studies show that ablest teachers often leave the profession less than five years after their first teaching assignment.[19] Most notably, the best science and math

teachers, already in short supply, are abandoning teaching for higher paying jobs in private industry. To compound the problem, the average age of teachers is 45 years; and nearly half are expected to retire before the turn of the century.[20] Many of these teachers are in schools already economically and geographically disadvantaged, where teacher attrition is high and recruitment low. So as teachers retire, their job position is unfilled and the problem of equalizing academic resources persists.

A deficiency in either area may affect accreditation status or the competitiveness of the student body. Meeting the needs of a handful of gifted or exceedingly intelligent students is not feasible via traditional programs in these districts. DLS allows a few students to enroll across many remote classrooms to make specialized courses cost effective. Seventy percent of TI-IN students enroll in math, science and foreign language subjects.

"User Driven" Networks

TI-IN Network is a "user driven" system. The courses and programs offered via the Network are those that have been identified by subscribers. Annually, each of the 790 subscribers is mailed a self-administered survey questionnaire requesting specific information about the priorities for student courses and inservice training for his/her district. The schedule of academic courses and topics for teacher training are derived from their responses about administrative requirements such as, bell schedules and instructional topics. For example, recently TI-IN learned that school classes for some users start on the half hour as well as the hour. The course schedule for 1989-90 was modified to include three channels programmed on the hour with one channel dedicated to the half hour.

Examples of TI-IN Network's instructional programming that has been added to the schedule based on a high number of user responses include: Marine Science, Japanese, French III and Spanish IV. Topics and presenters for staff development courses are identified and scheduled based on the actual feedback from teachers and administrators. To the extent that users enroll in courses the marketplace determines the longevity of the course offerings, a course with enrollment is retained as an offering, otherwise it is effectively dropped. This is an example of the market demand shaping the instructional program and the service.

Successful delivery of programs for elementary and secondary students via DLS have been demonstrated by national and regional providers. Usually, these courses are fully accredited and delivered by certified teachers. They range from ESL (English as a Second Language) instruction to Advanced Placement courses in science and mathematics. A majority of these programs are targeted to college

bound students and supplement rather than replace the curriculum offered at the local school.

Meeting the Demands of an Information Society

For those students and teachers who enjoy where they reside, their quality of life is greatly influenced by the access to information. Information is a commodity of modern day society.[21] Interestingly, information is of little use unless it is intelligently processed. Beginning in kindergarten through college, and throughout one's life, everyone is confronted with the continued need to learn. A willingness to continue learning, plus the free and easy access to education plays a major role in the quality of life that an "individual" enjoys.

Public secondary schools are beginning to play an expanded role in meeting the needs of educating not just the young but also the community. Equipped with satellite technology, school districts can effectively meet the expanding needs of their community. Satellite technology provides access to programming without regard to problems imposed by geographical limitations. While there are some places that receive the signal stronger than others, in most cases any location is capable of adequate reception with the use of a larger antenna.

School as a Community Resource

With the advent of satellite technology, there is an opportunity for the school to become the hub of instruction, an instructional resource center capable of improving the quality of life for those residing in rural communities. Today, to lead a successful and productive life, it is necessary to have access to continuing education. This applies not only to professionals and business executives but to all segments of the population.

During Spring of 1988, TI-IN Network commissioned a study to assess the interest in community-based continuing education across 100 subscribing sites. The results suggest that 89 percent of the administrators are interested in receiving "new" teleconferences that are designed to serve specific segments of their community. However, 45 percent report having policies that would restrict access to the satellite receiving classroom. These policies include restrictions based on: 1) access during the school day, 2) fees for opening school up on weekends and evenings and 3) additional fees levied for access by employees from business and industry. Ninety percent were willing to allow access to the classroom during school, though students and teachers have first priority. However, 46 percent would impose a fee of approximately twenty dollars to use the facilities after school hours.

Based on those surveyed, a wide range of topics were of interest to school administrators and to the community. Preferred topics ranged from management training to finance to concerns about health and self-improvement. Continued medical training for rural physicians is of interest for this specialized audience. Some respondents noted that high school curriculum such as art history and foreign languages would interest adults, too. Training in computer hardware and software acquisition for small businesses is of interest to the communities surveyed.

Educating New Users About DLS

The application of distance learning technology is still new to many school administrators. There is a need to educate them in the application of the technologies for their school, the cost effectiveness of DLS and in the basics of operating the equipment. Without an administrator clearly understanding the how, when and why's of DLS, it is impossible for them to present the concept as a viable option to the local school board who approves the expenditure of funds.

The attributes of ease-of-use and maintenance-free technology are critical during the implementation of a DLS. Comprehensive training programs targeted to all types of users help alleviate confusion of operating "new" technology. Likewise, thorough testing of the equipment before and at the time of installation will help prevent frustration caused by malfunctions. Introducing DLS to the skeptical educational community, where change relies on new behaviors, is in itself a challenge without complicating it with technical problems.

Cost Effectiveness

A paradox exists as DLS must recover enough of its operating costs to continue performing services, yet local school districts (subscribers) that need the services are some of the poorest in the nation. They simply cannot cover the cost of equipment and on-going fees for operation of the downlink from their school budgets. To provide a viable service to schools the subscription rates paid by users must be competitive with other instructional alternatives, though commensurate with actual costs. The size of the subscriber base and the volume of programming help maintain rates that are "affordable" to public schools and sustain the ongoing enterprise, thus DLS needs time to grow before cost will decrease.

The key to the success of a DLS is to assure that the needs and concerns of the users are being met and fees are paid on a timely basis. A marketing strategy for DLS must be instituted to highlight how these needs are being served and insure the growth of the subscriber base.

THE ECONOMICS OF OPERATING A DISTANCE LEARNING SYSTEM

Financial factors are an important consideration given the fragmented market and the financial requirements of what is a capital intensive business. The actual cost for operations of a satellite network vary greatly though they are correlated with the volume of services and type of equipment installed. The multi-million dollar operation includes expenses associated with: the acquisition of uplink and downlink equipment that requires an outlay of hundreds of thousands of dollars; the maintenance of the equipment; the costs for leasing satellite time; the costs of disseminating information and marketing the programming; the costs for administering, developing and contracting with instructors; and the actual expense for leasing the studio facilities during broadcasts.

Substantial capital is required to enter into such a venture. The initial investments often represent the least expensive costs. When an institution or organization purchases a million dollar uplink, this is just the beginning of what turns into enormous costs. Reliance on a large subscriber base coupled with student registration and equipment fees defray operating costs. To achieve balance between operating costs and revenue income, a larger subscriber base is required. Few single states have the potential for cost effective, full capability networks. Any public institution needs substantial capital to operate a Distance Learning System.

REQUIREMENTS FOR AN EFFECTIVE DISTANCE LEARNING NETWORK

To develop a successful network several important elements must exist. These elements include: technology, programming and willing participants for whom the service meets one's actual and perceived needs. Quality control requires the monitoring of all broadcasts for technical as well as instructional integrity. A partnership must agree upon the standards by which quality programming will be evaluated. Quality controls for DLS to be overseen by the partnership include: 1) the installation of equipment, 2) a quality broadcast signal and clear reception, 3) engaging instructional programming, 4) timely mailings of handouts and broadcast schedules and 5) timely responses to requests made by users and to correcting technical malfunctions. Setting standards, communicating those standards to technical and programming staff, monitoring for those standards and making adjustments based on those standards are particularly difficult as a partnership moves from two to many members with multiple broadcast facilities. The Star Schools partnerships are currently struggling with setting standards and managing multiple broadcast facilities that insure the highest quality programming and technology. Regardless of the process undertaken to maintain high standards for a DLS, the goal is to make the technology as transparent to the user as possible.

OBSTACLES TO THE GROWTH OF DISTANCE LEARNING

The power of distance learning technologies to address the expanded educational needs of an information society requires changes in institutions which have traditionally been resistant to innovation. The state legislatures, department of educations and other regulatory agencies must harness and promote learning by technology. This requires modifying the existing regulations to accommodate these new instructional strategies. Overcoming public and socio-political obstacles, along with technophopia, and equipment standardization are challenges for Distance Learning Systems.

PUBLIC POLICY

Under the rubric of public policy falls funding models for education, teacher certification, course accreditation and textbook approval. Few policies are amenable to distance learning technologies as the guidelines for each vary from state to state. The critical question that has yet to be answered is whether these policies serve in the best interest of the students.

Funding Models

School budgets need to be increased if distance learning technology is to be widely implemented. Currently, several states are examining funding models that take into account technology use for statewide networks. North Carolina appropriated funds for this purpose in 1988; other states like Texas and Oregon are proposing similar legislation. The State of Illinois has proposed funding that would provide matching grants whereby the state pays for a majority of the equipment costs and the districts who qualify, pay the remaining expenses associated with installing approximately 50 to 100 satellite downlinks. As of June 1989, the bill had was being voted on by the House of Representatives.

For the application of the technology to be effectively implemented and used over time, it is important that schools have a financial stake in its successful utilization. Such a stake may take the form of a matching grant funded by the state or a private corporation, the use of a voucher system, or other incentives which encourage technological investment.

Teacher Certification

In general, few states grant reciprocity to teaching credentials from another state. This means that teachers are required to apply for certification in each state

where courses are broadcast. In many cases, they must not only meet individual state course requirements in state history, counseling and guidance, but also take physical examinations, pass fingerprint checks and submit to various other reviews. These are mandatory despite the fact that the instructor may never physically locate within the state boundaries.

Other issues deal with competency testing. Because of various state requirements, teachers must take a minimum of three national tests -- the National Teacher Exam (NTE), the California Test of Basic Skills (CBEST), the California Achievement Test (CAT). In addition, they are tested in their special subject fields such as, the National Language Test for teaching foreign languages.

Finally, after passing all of the above, these teachers must meet individual state and local requirements relative to student teaching experience, time spent in classroom instruction and meet the requirements of the individual school district review process. Efforts to comply with states credentialing requirements have created a large file of paperwork and excessive costs for DLS. A review of that file leads one to the conclusion that there are no generally applied standards. Rather that each state has individual regulations, and that no state at this point in time, has a clearly defined way of dealing with the phenomenon of distance learning.

Course Accreditation

Once past the teacher certification issues, one is confronted with the problem of having course work approved for credit. Here again, each state has different requirements related to subject matter, such as: what subject matter is taught, the scope and sequence of that subject matter, the amount of time per subject area and what type of credit may be granted for successful completion of the courses, i.e., should the credit be elective or meet requirements for graduation. A few states such as Texas have a formal application process geared for distance learning. In this case the application must be completed by the course provider and approved by the Texas Education Agency.

Unfortunately, most of the curriculum approval is at the county or local level. This makes the process even more complex when trying to deal with many different individual entities.

State Approved Textbooks

To complicate the process even more, all textbooks used in a course must be approved locally or by the state. It is literally impossible to offer a course in which there is a standard text that is used nationwide. Many states pay only for state

adopted textbooks so, to the extent an alternative book is used then the local school district has the burden of paying for a new one. This poses a hardship on many school districts and negatively impacts the use of distance learning.

SOCIO-POLITICAL OBSTACLES

Many of the distance learning technologies enable the transmission of courses irrespective of state boundaries. Though "far" and "near" have no real meaning in DLS, state agencies of education are enacting policies to retain state identification. While state agencies may be favorable toward DLS, they have a need for the local school districts to perceive them as the controlling entity.

There is a bandwagon effect with distance learning. The Star Schools Program and other highly publicized technology implementations have resulted in leaders in the distance learning field becoming highly visible. Consequently, administrators in state agencies, institutions of higher learning and local schools are jumping on board because of the prestige ascribed to their colleagues. In effect, many agencies and institutions are not equipped with the knowledge and policies necessary to implement a DLS.

Since distance learning systems frequently cross state boundaries, it is important that state legislatures, various governmental agencies, and teacher groups become comfortable with the application of this technology to meet their specific communication and educational needs. Organized labor is still uncertain that a DLS will not replace rather than supplement on-site teaching staff. The teacher union is a powerful entity at the national, state and local levels. One thing is clear, without the endorsement of the various interested parties, there is little chance for success.

TECHNOPHOPIA AND THE EDUCATIONAL COMMUNITY

Fear of change and using new technology is responsible for resistance to DLS within some school districts. Unfortunately, like most fears these attitudes are rooted in myths and inexperience. There seems to be the belief that a technology will replace teachers and administrators. For some, this possibility is so unsettling that they would rather not have anything to do with television instruction. It is almost as if they believe that by ignoring and denial of the movement will make it disappear.

Some administrators find it easier to do nothing than to change a system that appears to be working adequately, even if that system could be enhanced through DLS. Unfortunately, there is little incentive for many administrators as our educational institutions do not reward innovative behavior.

Generally, education is equated with schools and with well-defined physical boundaries offering face-to-face instruction using curriculum that is "tried and true." Education conducted over television, even with interactive hardware, is viewed as not just a different type of learning experience but one that is inferior.

Information campaigns target to demystifying the technology are the best method of overcoming technophopia. But it must be recognized that a small percentage of the educational leadership are the hard-core group, most comfortable with the status quo. They are unlikely to change no matter what. Fortunately, this is the minority.

TECHNOLOGICAL STANDARDIZATION

In the ideal world the user has the right to select and choose among the offerings across all Distance Learning Systems. The reality is that different systems are available using incompatible technology. For example, the frequencies used for satellite transmission vary from C-band to Ku-band. Those with Ku-band must be converted at an additional expense to receive C-band transmissions and vice versa. The compatibility question may be equated with the problems that arose in the microcomputer business between IBM DOS versus Apple formats.

From a hardware and program provider perspective, compatibility raises more questions. If a DLS vendor installs equipment in schools and assumes the responsibility for maintaining it, then who becomes responsible for maintenance if the school uses multiple programming and equipment sources?

Perhaps, as Distance Learning Systems advance and the equipment is standardized, these systems will become less hardware driven and more program oriented. The private corporation must maintain economic viability. Entities, like TI-IN Network, must continue to develop and transmit high quality, yet innovative programming at competitive rates. The opportunities and challenges for educational partnerships with private corporations will increase as solutions to current obstacles are reached.

SATELLITE SHORTAGE

As the growth of videoconferencing and satellite use of the Ku-band transponders expands, a shortage of transponder time has been reportedly developing

since early 1989.[1] On an overall basis, greater than 80 percent of the domestic transponders have been reportedly sold or leased; on popular satellites virtually all the capacity has been leased or sold.[22] The shortage is particularly acute for occasional use. Other effects of shortage are the drastic increase in costs levied by satellite providers of time on the Ku-band transponders. Lynn Fisher, director of business development for Contel, which provides Ku-band capacity to occasional users suggests that growth on this frequency has been spurred by "artificially-low satellite prices that were available during recent satellite overcapacity." [23]

Some business analysts such as, Paul Heinerscheild, vice president and general manager of Satellite Network Systems suggests that the capacity problem will be short-term, but that will put a temporary limit on the growth of business and educational television. AT&T is less concerned about the shortage, Ellen Veden, marketing manager for Skynet Video Firm, believes that satellite users may be convinced to switch from transponders to digital land lines.[24]

CHALLENGES FOR THE FUTURE

Moving away from the traditional model of education and finding solutions to public policy issues is a big mandate for the next five years. Today, with the advantage of satellite technology, every school in the nation can become an educational resource offering full curriculum to its elementary and junior/senior high school students. The resource also serves its adult community in offering courses in health care, finance and professional continuing education programs. Distance learning technologies and their applications may enhance the role of the school in the community for all segments of the population especially as the size of the aging population grows and leisure time increases.

One conclusion of these authors is that the state department of educations must take the leadership role by bringing the various special interest groups together in accepting DLS. This requires formulating policy, seeking support of the teacher organization and promoting favorable funding legislation.

Even in the most favorable environment, two groups can become easily disenchanted. Universities and colleges fight over turf issues related to service areas and teacher organizations fear loss of jobs. Each of these concerns are best dealt

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[1] TI-IN Network and other DLS providers use the Ku-band versus the C-band satellites because: 1) up to now the costs have been lower, 2) one transponder may be divided into 2 channels hence, resulting in more economical costs for users and 3) less interference from other types of broadcast signals.

with through up-front and thoughtful concern for the opposing point-of-view. The facts are that the need for programming far outstrip the resources, and no teacher has ever or will ever lose their job solely because of DLS. These groups, however, must be satisfied before successful distance learning systems are put in place.

STRIVING FOR EXCELLENCE

Providing excellent models of distance learning applications will do more to engender enthusiasm and support for DLS. Unlike the traditional classroom, mediocre instruction is highly visible via distance learning technologies. Exemplary programming and instructors should be cultivated during the next five years of widespread adoption of DLS.

The classroom of the near future will be a hybrid of technology for learning. Satellite technology will be used in conjunction with audio interaction and computer-based instruction or conferencing. Other interactive technologies, such as electronic writing tablets and polling devices, will become more widely used. Facsimile machines will be installed to overcome the logistical problems associated with the transfer of paper in the electronic classroom.

SERVING THE DISENFRANCHISED

For disadvantaged and underserved populations in the our society DLS has the potential of equalizing the access to information and academic resources. The chasm is enlarging between the information "haves" and "have nots." If our system of education is to continue its mission of universal access then solutions for these segments of society must be addressed. DLS affords a student the opportunity to take advanced curriculum that will make he/she competitive for entrance in prestigious institutions of higher learning. At the better institutions of higher learning entrance requirements are increasingly competitive.

Physically disabled students may benefit from satellite transmitted academic resources. For those who are homebound, satellite technology has the capability of equalizing one's access to instructional offerings by equipping a home with the necessary satellite receive technology. In addition, the hearing impaired may utilize satellite programming when the necessary real-time signing or closed captioning is applied to the instruction. If applied wisely, satellite delivered instruction has the capability of equalizing the access to academic resources by those students who have been traditionally underserved. Access is made possible only when the partnership model for instructional programming and technology operation are successfully implemented.

MAKING THE PARTNERSHIP MODEL WORK

Cooperation is the operative word for distance learning in the next five years. The future model of distance learning is emerging as a Nationwide Sharing Network. In this model, multiple public educational institutions and agencies join in partnership with private enterprise to provide programming that is exemplary but heretofore, available only on a regional basis. These programs are broadcast (uplinked) from the originator's own facilities into an existing satellite network. Maintaining a partnership will require flexibility as well as cooperation among all the participants. Like any joint venture, the maintenance of the partnership will require work. Short run goals must be carefully balanced with the long-run objectives for the partnership. Collaboration between private enterprise and public education authorities will continue to foster innovative and cost-effective models of distance learning.

FIVE-YEAR HORIZON FOR DISTANCE LEARNING

Technology Hybrid

The challenge for the future rests on the shoulders of entrepreneurial partnerships to combine all the technologies available within the educational setting and to apply them for the uses most appropriate. The electronic satellite classroom of the future will facilitate instruction using a combination of video, computers, videodiscs, audio and video conferencing. To become active learners, students require the capability to interact with both instructors and peers. The technological capacity for instructional variety exists today. However, the challenge for today and tomorrow is how to move from existing teaching strategies for instruction to developing those which integrate all media into a new dynamic communication and education format that stimulates students to be proactive learners. Students of today must be prepared for the "information society" which is characterized by the use of technology and a global communications network.

Economic Development

Among states that are largely rural and economically poor the concern for economic development by attracting new businesses to the community is a high priority. Insomuch that a state takes a proactive role in using satellite networks for communications and education then the network becomes a resource that may be marketed to prospective businesses. For example, a rural state rates very high on the list of criteria for "quality of life" however, low in respect to access to

educational resources. States with distance learning networks in place can sell the concept of providing access to a nationwide communications and educational network as well as having a statewide network. New industry may be convinced to gamble on settling in a smaller, rural state if convinced that they have easily access to national communications network with access to continuing education training. Studies have suggested that there is a link between telecommunications and economic development.[23]

Community Based Programming

The increase in both leisure time and the aging population which is living healthier and longer lives in our society have resulted in a renewed interest in life-long learning. If a school has access to satellite-transmitted instruction then the school becomes a potential resource for the community as well as elementary and high school students and their teachers. With the growth of prerecorded instruction available on videotape, there is reason to believe that courses offered via live, interactive satellite would be of interest; topics for community members may range from golf strategies to Russian. In the future the electronic classroom has the capacity to serve all segments of the community, its only limitation will be that of the creativity of the provider.

SUMMARY

Combining the resources from the private and public sector into partnerships is an effective strategy for developing a Distance Learning System. These partnerships address the problems of economics, quality control and meeting user needs using satellite-delivered academic and staff development instruction in schools across the continental United States. However, the longevity of DLS is dependent on a wide range of factors including: 1) restructuring of the school funding models, 2) restructuring of the classroom to accommodate technological based instruction, 3) revamping of educational policy and regulations, such as, teacher certification and 4) implementation and adoption of DLS by teachers, students and administrators. The challenge for the successful implementation and its widespread application will be determined in the decade of the 1990's.

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